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AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

LISTING OF CLAIMS:

1-95 (Canceled)

96. (New) Electrical reactor for reforming a gas comprising at least one possibly substituted hydrocarbon, and/or at least one possibly substituted organic compound, containing carbon atoms and hydrogen as well as at least one heteroatom, in the presence of an oxidizing gas;

said reactor including:

- an enclosure;
- a reaction chamber provided with at least two electrodes and disposed inside the enclosure, said reaction chamber comprising at least one conductive lining material and defining as a whole or in part a reforming catalyst, the lining in question being electrically insulated from the metal wall of the enclosure so as to prevent any short-circuit;
- at least one supply of gas to be reformed;
- at least one oxidizing gas supply, that is distinct or not from the supply of gas to be reformed;
- at least one reformed gas outlet; and

- one electrical source allowing to power up the electrodes and resulting in the production of an electronic flux in the conductive lining between the electrodes; and possibly

- at least one heat input into the lining, optionally preferably resulting from production of the electronic flux in the lining.

97. (New) Electrical reactor for reforming a gas comprising at least one possibly substituted hydrocarbon, and/or at least one possibly substituted organic compound, containing carbon atoms and hydrogen as well as at least one heteroatom, in the presence of an oxidizing gas;

said reactor including:

- an enclosure;

- a reaction chamber provided with at least two electrodes and disposed inside the enclosure, said reaction chamber comprising at least one conductive lining material and defining as a whole or in part a reforming catalyst, the lining in question being electrically insulated from the metal wall of the enclosure so as to prevent any short-circuit;

- at least one supply of gas to be reformed;

- at least one oxidizing gas supply, that is distinct or not from the supply of gas to be reformed;

- at least one reformed gas outlet; and

- one electrical source allowing to power up the electrodes and resulting in the production of an electronic flux in the conductive lining between the electrodes, said lining defining an iron or iron alloy based catalyst; and possibly

- at least one heat input into the lining, optionally preferably resulting from production of the electronic flux in the lining.

98. (New) Reactor according to claim 96, in which the reaction chamber is of parallelepiped shape or cylindrical.

99. (New) Reactor according to claim 96, in which at least one of the electrodes is of hollow type and constitutes the inlet port of the gas to be reformed.

100. (New) Reactor according to claim 96, in which at least one of the electrodes is of hollow type and constitutes a gas to be reformed and oxidizing gas supply duct.

101. (New) Reactor according to claim 96, in which at least one of the electrodes is of hollow type and constitutes the outlet for the gases from reforming.

102. (New) Reactor according to claim 96, in which at least two of the electrodes are disposed opposite one another.

103. (New) Reactor according to claim 96, comprising at least two metal electrodes each consisting of a tubular member and a hollow perforated disk, said disk is located at the end of the tube that opens into the reaction chamber and is in contact with the lining of the reaction chamber to ensure electrical current supply to the lining and its temperature rise by Joule effect.

104. (New) Reactor according to claim 96, in which the material of the conductive lining is selected from the group consisting of elements of group VIII of the periodic table (CAS numbering) and alloys containing at least one of said elements, preferably the lining is selected from the group consisting of at least 80% of one or more of said elements of group VIII, still more preferably from the group consisting of iron, nickel, cobalt, and alloys containing at least 80% of one or more of these elements, still more advantageously the lining is selected from the group consisting of carbon steels.

105. (New) Reactor according to claim 96, in which the lining consists of balls and/or threads based on at least one element of group VIII or on at least one metal oxide, preferably based on iron or steel.

106. (New) Reactor according to claim 97, in which the lining consists of balls and/or threads based on iron or steel.

107. (New) Reactor according to claim 96, in which the material, in dense state, has an electrical resistivity at 20 °C that is preferably comprised between 50 x 10^{-9} and 2000 x 10^{-9} ohm-m, more preferably comprised between 60 x 10^{-9} and 500 x 10^{-9} ohm-m, and still more preferably comprised between 90 x 10^{-9} and 200 x 10^{-9} ohm-m.

108. (New) Reactor according to claim 104, in which the lining consists of elements of the conductive material in a form selected from the group consisting of straws, fibers, filings, frits, balls, nails, threads, filaments, wools, rods, bolts, nuts, washers, chips, powders, grains, granules and perforated plates.

109. (New) Reactor according to claim 108, in which the lining material at least partly consists of perforated plates and the surface percentage of the openings in the plate is comprised between 5 and 40%, still more preferably between 10 and 20%.

110. (New) Reactor according to claim 108, in which the material of the lining is made of soft steel wool.

111. (New) Reactor according to claim 103, in which the material of the lining is previously treated to increase at least one of the following characteristics:

- specific surface area;

- purity; and
- chemical activity.

112. (New) Reactor according to claim 111, in which the previous treatment is a treatment with a mineral acid and/or a heat treatment.

113. (New) Reactor according to claim 108, in which the conductive lining consists of fibers having a characteristic diameter comprised between 25 micrometers and 5 mm, still more preferably between 40 micrometers and 2.5 mm, and still more preferably between 50 micrometers and 1 mm, as well as a length higher than 10 times its characteristic diameter, more preferably higher than 20 times its characteristic diameter and still more preferably higher than 50 times its characteristic diameter.

114. (New) Reactor according to claim 96, in which the conductive lining defines a porous medium having a volume surface of more than 400 m^2 of exposed surface per m^3 of reaction chamber, preferably more than 1000 m^2/m^3, still more preferably more than 2000 m^2/m^3.

115. (New) Reactor according to claim 96, in which at least one gas to be reformed supply duct is mounted perpendicular to the direction of the electronic flux produced between the electrodes.

116. (New) Reactor according to claim 96, in which the reaction chamber is cylindrical and at least one of the ducts for supplying a gas mixture consisting of the gas to be reformed and/or the oxidizing gas, is disposed tangentially with respect to the cylindrical wall of the reaction chamber.

117. (New) Reactor according to claim 96, in which at least one of the outlets of the reformed gases obtained, is disposed in the reaction chamber opposite the gas supply.

118. (New) Reactor according to claim 96, in which the electrical source consists of a current transformer in the case of an electrical supply of alternating current (AC) type or a current rectifier in the case of an electrical supply of the direct current (DC) type, which electrical source has a power that is calculated according to the energy needs of the reforming reactions under consideration and said electrical source having to supply a minimum amperage calculated by the following equation:

$I_{minimum} = \lambda \cdot F$ (10)

in which: $I_{minimum}$ is the minimum current to be applied, given in A;

λ is a parameter that depends on the geometry of the reactor, of the type of lining, of the operating conditions and the gas to be reformed; and

F is the molar flow of the gas to be reformed, expressed in mole of gas to be reformed / second,

the parameter λ is established experimentally by varying the current by means of a source of variable amperage (AC or DC) and also by varying the flow of gas to be reformed.

119. (New) Reactor according to claim 96, in which the conductive lining has a porosity index comprised between 0.50 and 0.98, more preferably comprised between 0.55 and 0.95, and still more preferably between 0.60 and 0.90.

120. (New) Reactor according to claim 96, in which the time of residence of the reactants is preferably more than 0.1 second, more preferably more than 1 second, and still more preferably more than 3 seconds.

121. (New) Reactor according to claim 119, in which the lining consists of a wool made of steel threads mixed with spherical materials such as steel balls.

122. (New) Reactor according to claim 96, in which in addition to the conductive lining, the reaction chamber contains non conductive and/or semi-conductive and/or electrically insulating materials, such as ceramics and alumina, the latter being adequately disposed in the reaction chamber in a manner to adjust the total electrical resistance of the lining.

123. (New) Reactor according to claim 103, in which at least one electrode is of the perforated type, and having an opening diameter of more than 25 micrometers, the holes being preferably uniformly distributed according to a density of at most 100,000 openings per cm^2 of electrode surface.

124. (New) Reactor according to claim 123, in which the holes are such that the energy loss resulting from gas crossing through the electrode or electrodes is not in excess of 0.1 atmosphere.

125. (New) Reactor according to claim 123, in which the openings are distributed at the surface of the perforated electrode so as to provide a uniform diffusion of the gases through the reaction chamber.

126. (New) Reactor according to claim 123, in which the size of the openings increases in radial direction of the perforated electrode or electrodes.

127. (New) Reactor according to claim 96, in which one or more of the electrodes is such that its face exposed to the lining is provided with protuberances and/or projections, which are preferably conical and still more preferably needle shaped.

128. (New) Reactor according to claim 127, in which the protuberances and/or projections are such that their spacing density corresponds, in a preferred embodiment, to more than 0.5 unit per cm^2 of electrode.

129. (New) Reactor according to claim 127, in which the length of the protuberances and/or projections may vary between 0.001 and 0.1 times the length of the lining of the reaction chamber, and the width of these protuberances and/or these projections may vary between 0.001 and 0.1 times the diameter of the disk of the electrode.

130. (New) Reactor according to claim 127, in which the projections are conical.

131. (New) Reactor according to claim 130, in which the ratio between cone height and cone diameter is at least 1, preferably this ratio is higher than 5 and still more preferably said ratio is higher than 10.

132. (New) Reactor according to claim 96, dimensioned so as to constitute a reactor of the compact type.

133. (New) Electrical process for gas reforming consisting in allowing the gas to be reformed to react in the presence of at least one oxidizing gas, in an electrical reforming reactor according to claim 96.

134. (New) Electrical process according to claim 133, comprising at least the following steps:

a) preparing, inside or outside the reforming reactor, a mixture of gas to be reformed and of the oxidizing gas;

b) contacting the mixture obtained in step a) with the lining of the reaction chamber, preferably by passing it through a hollow electrode;

c) applying an electronic flux to power up the electrodes of the reaction chamber;

d) heating the lining of said reactor with the electronic flux at a temperature allowing catalytic transformation of said gaseous mixture; and

e) recovering the gas mixture from the reforming, preferably by passing it through another hollow electrode.

135. (New) Electrical process according to claim 134, in which steps c) and d) are carried out before step b).

136. (New) Electrical process according to claim 133, in which the lining of the reaction chamber is pre-heated before feeding the gas to be reformed and the oxidizing gas, at a temperature comprised between 300 °C and 1500 °C, under inert atmosphere such as nitrogen, by previously carrying out step c).

137. (New) Electrical process according to claim 133, in which the gas to be reformed consists of at least one compound of the group consisting of C_1 to C_{12} hydrocarbons, which may be substituted for example with the following groups: alcohol, carboxylic acid, ketone, epoxy, ether, peroxide, amino, nitro, cyanide, diazo, azide, oxime, and halides such as fluoro, bromo, chloro, and iodo, said hydrocarbons being branched, unbranched, linear, cyclic, saturated, unsaturated, aliphatic, benzenic and aromatic, and preferably having a boiling point lower than 200 °C, more preferably a boiling point lower than 150 °C, and still more preferably a boiling point lower than 100 °C.

138. (New) Electrical process according to claim 137, in which the hydrocarbons are selected from the group consisting of the compounds: methane, ethane, propane, butane, pentane, hexane, heptane, octane, nonane, decane, undecane, dodecane, each of these compounds being linear or branched, including mixtures of at least two of these compounds.

139. (New) Electrical process according to claim 133, in which the gas to be reformed is a natural gas.

140. (New) Electrical process according to claim 139, in which the gas to be reformed is a natural gas initially containing sulfur and having previously been treated to remove sulfur, preferably so as to advantageously reduce the sulfur content in excess of 0.4%, more advantageously in excess of 0.1% and still more advantageously in excess of 0.01%, the percentages being given in volume.

141. (New) Electrical process according to claim 133, in which part of or the entire lining reacts with the sulfur that is present in the gas to be reformed and the part of the lining thus used is called sacrificial lining.

142. (New) Electrical process according to claim 133, in which the gas to be reformed is a biogas, resulting for example from the fermentation of various organic matters, said biogas preferably consisting of 35 to 70% methane, 35 to 60% carbon dioxide, from 0 to 3 % hydrogen, from 0 to 1 % oxygen, from 0 to 3 % nitrogen, from 0 to 5 % various gases (hydrogen disulfide, ammonia, etc) and water vapor.

143. (New) Electrical process according to claim 133, in which the gas to be reformed is a natural gas consisting of 70 to 99 % methane, accompanied with 0 to 10 % ethylene, from 0 to 25 % ethane, from 0 to 10 % propane, from 0 to 8 % butane, from 0 to 5 % hydrogen, from 0 to 2 % carbon monoxide, from 0 to 2 % oxygen, from 0 to 15 % nitrogen, from 0 to 10 % carbon dioxide, from 0 to 2 % water, from 0 to 3 % of one or more C_5 to C_{12} hydrocarbons and traces of other gases.

144. (New) Electrical process according to claim 133, in which the oxidizing gas consists of at least one gas selected from the group consisting of carbon dioxide, carbon monoxide, water, oxygen, nitrogen oxides such as NO, N_2O, N_2O_5, NO_2, NO_3, N_2O_3, and mixtures of at least two of these components, preferably mixtures of carbon dioxide and water.

145. (New) Electrical process according to claim 133, in which the gas to be reformed consists of at least one of the compounds of the group consisting of organic compounds of molecular structure whose constituents are carbon and hydrogen, as well as one or more heteroatoms such as oxygen and nitrogen, which may advantageously comprise one or more functional groups selected from the group consisting of alcohols, ethers, ether-oxides, phenols, aldehydes, ketones, acids, amines, amides, nitriles, esters, oxides, oximes and preferably having a boiling point lower than 200 °C, more preferably a boiling point lower than 150 °C, and still more preferably a boiling point lower than 100 °C.

146. (New) Process according to claim 145, in which the organic compounds are methanol and/or ethanol.

147. (New) Electrical process according to claim 133, in which the gas to be reformed may also contain one or more gases selected from the group consisting of hydrogen, nitrogen, oxygen, water vapor, carbon monoxide, carbon dioxide, and

inert gases from group VIIIA of the periodic table (CAS numbering), or mixtures of at least two thereof.

148. (New) Process according to claim 133, in which the mixture of gases supplied to the reaction chamber contains less than 5 volume % of oxygen.

149. (New) Electrical process according to claim 133, in which the mixture of gas to be reformed and oxidizing gas consists of 25 to 60 % methane, from 0 to 75 % water vapor and from 0 to 75 % carbon dioxide, preferably from 30 to 60 % methane, from 15 to 60 % water vapor, and from 10 to 60 % carbon dioxide, and still more preferably from 35 to 50 % methane and 20 to 60 % water vapor and from 10 to 50 % carbon dioxide.

150. (New) Electrical process according to claim 149, in which the mixture of gas to be reformed and of oxidizing gas consists, in a preferred mode, of about 39.0 % methane, and the oxidizing gas consists of about 49.0 % water vapor and bout 12.0 % carbon dioxide.

151. (New) Electrical process according to claim 133, in which the carbon/oxygen atomic molar ratio in the gas mixture that is fed into the reaction chamber is comprised between 0.2 and 1.0, preferably this ratio is comprised

between 0.5 and 1.0, and still more preferably said ratio is comprised between 0.65 and 1.0.

152. (New) Electrical process according to claim 133, in which step c) is carried by using an alternating (AC) or direct (DC) current that is modulated as a function of the level of temperature to be maintained in the reactor, preferably in continuous by preventing stops and applying only moderate changes in the amperage.

153. (New) Electrical process according to claim 133, in which steps b), c) and d) are carried at a temperature level located between 300 and 1500 °C, preferably in a range located between 600 and 1000 °C, and still more preferably in a range located between 700 and 900 °C.

154. (New) Electrical process according to claim 133, in which steps b), c) and d) are carried out at a pressure in the reaction chamber that is higher than 0.001 atmosphere and that is preferably comprised between 0.1 and 50 atmospheres, and that is still more preferably comprised between 0.5 and 20 atmospheres.

155. (New) Electrical process according to claim 154, in which the pressure profile is maintained constant in the reaction chamber during reforming.

156. (New) Electrical process according to claim 133, carried out in continuous.

157. (New) Electrical process according to claim 133, in which the reforming reaction is catalyzed with jumping micro-arcs between the particles of the lining or with activated sites at the surface of the particles of lining, through accumulation of charges and/or by passing an electrical current.

158. (New) Electrical process according to claim 133, carried out in batch for periods of at least 30 minutes.

159. (New) Electrical process according to claim 158, in which the lining is replaced between two periods of implementation.

160. (New) Electrical process according to claim 133, in which the conductive lining has a porosity index comprised between 0.50 and 0.98, more preferably between 0.55 and 0.95, and still more advantageously between 0.60 and 0.90.

161. (New) Electrical process according to claim 133, in which the time of residence of the reactants is preferably more than 0.1 second, more preferably more than 1 second, and still more preferably more than 3 seconds.

162. (New) Electrical process according to claim 133, in which for at least one of the electrodes, the perforations are uniformly distributed with a density that corresponds to at most 100,000 openings per cm^2 of electrode surface and said openings are such that the loss of charge due to passage of gas through the electrode or electrodes is not in excess of 0.1 atmosphere.

163. (New) Electrical process for reforming hydrocarbons and/or organic compounds, consisting in reacting the latter in the presence of an oxidizing gas (preferably in the presence of water vapor and/or carbon dioxide and/or other gases), in a reaction chamber containing:

1) a metal based conductive lining defining a porous medium having a volume surface of more than 400 m^2 of exposed surface per m^3 of reaction chamber, this lining being simultaneously used as heating medium and catalysis medium; and

2) two metal electrodes each consisting of a tubular member and a perforated hollow disk in contact with the lining to provide for the supply of the electrical current required for heating this lining by Joule effect and to assist the catalysis by electron movements;

comprising the following steps:

a) mixing hydrocarbons and/or organic compounds and the oxidizing gas;

b) introducing the mixture of step a) in the reaction chamber by injection into one of the electrodes;

c) contacting the mixture of step a) with the lining;

d) applying an electronic flux to power up the electrodes of the reaction chamber;

e) heating the lining with the electronic flux and producing an electron movement enabling to assist the catalysis, by supplying an electrical current by means of the two electrodes, this current being such that it passes directly into the lining; and

f) evacuating and recovering gas from the reactor by passing it into the other electrode.

164. (New) Electrical process according to claim 163 for reforming methane, consisting in reacting the latter in the presence of carbon dioxide and water vapor, in a reaction chamber having an available volume of 322 cm^3 containing:

1) a conductive lining consisting of 50 g of steel wool defining a porous medium, which medium consists of alternating layers of compacted steel wool each being approximately 1 cm; and

2) two metal electrodes made of carbon steel each consisting of a tubular member about 30.48 cm long and a hollow disk having a diameter of about 6.35 cm, which disk is perforated, provided with projections so as to provide a good contact with the lining;

comprising the following steps:

a) mixing the gaseous reactants, which are methane, carbon dioxide and water vapor, in respective concentrations of about 39 %, 12 % and 49.0 %;

b) introducing the mixture of step a) in the reaction chamber by injection into the inlet electrode;

c) contacting the mixture of step a) with the lining;

d) applying an electronic flux to power up the electrodes of the reaction chamber, which flux is obtained by means of a direct electrical current of an intensity of about 150 amperes;

e) heating the lining with the electronic flux at a temperature of about 780 °C and producing an electrical current by means of the two electrodes, this current being such that it directly passes into the lining; and

f) evacuating and recovering gas from the reactor by passing it into the outlet electrode, which gas consists of hydrogen, carbon monoxide, oxygen, methane and carbon dioxide, in respective concentrations of about 69 %, 28 %, 0.4 %, 1.7 % and 0.9 % as established on an anhydrous and normalized basis.

165. (New) Electrical process for reforming hydrocarbons and/or organic compounds, consisting in reacting the latter in the presence of an oxidizing gas (preferably in the presence of water vapor and/or carbon dioxide and/or other gases), in a reaction chamber containing:

1) a metal based conductive lining defining a porous medium having a volume surface of more than 400 m^2 of exposed surface per m^3 of reaction chamber,

this lining being simultaneously used as heating medium and catalysis medium; and

2) two metal electrodes each consisting of a full disk in contact with the lining to provide for the supply of required electrical current for heating this lining by Joule effect and to assist the catalysis by electron movement;

comprising the following steps:

a) mixing the hydrocarbons and/or the organic compounds and the oxidizing gas;

b) introducing in the reaction chamber, the mixture of step a) by injection at the level of the radial or tangential openings of the reaction chamber;

c) contacting the mixture of step a) with the lining;

d) applying an electronic flux to power up the electrodes of the reaction chamber;

e) heating the lining with the electronic flux and producing an electron movement allowing to assist the catalysis by supplying an electrical current by means of the two electrodes, this current being such that it passes directly into the lining; and

f) evacuating and recovering gas from the reactor by axial, tangential or radial gliding by means of axial, radial or tangential openings.

166. (New) Electrical process according to claim 165 for the reforming of methane, consisting in reacting the latter in the presence of carbon dioxide and water vapor, in a reaction chamber having an available volume of 26.5 litres containing:

1) a conductive lining consisting of steel filaments defining a porous medium, which medium consists of said filaments in which each is about 1 cm long and having a diameter of about 0.5 mm; and

2) two metal electrodes made of carbon steel each consisting of a rod about 50 cm long and a disk having a diameter of about 15 cm, which disk is provided with projections so as to provide a good contact with the lining;

comprising the following steps:

a) mixing the gaseous reactants, which are methane, carbon dioxide and water vapor, at respective concentrations of about 39 %, 12 % and 49.0 %;

b) introducing the mixture of step a) in the reaction chamber by injection at the level of the radial and/or tangential inlet openings of the reaction chamber, which are located at the start of the reaction chamber;

c) contacting the mixture of step a) with the lining;

d) applying an electronic flux to power up the electrodes of the reaction chamber, which flux is obtained with an direct electrical current of an intensity of about 500 amperes;

e) heating the lining with the electronic flux at a temperature of about 780 °C and producing an electron movement allowing to assist the catalysis, by supplying an electrical current by means of the two electrodes, this current being such that it directly passes into the lining; and

f) evacuating and recovering the gas from the reactor by passing it into the radial outlet openings, which are located at the end of the reaction chamber, and which gas consists of hydrogen, carbon monoxide, oxygen, methane and carbon dioxide, at respective concentrations of about 69 %, 28 %, 0.4 %, 1.7 % and 0.9 %, as established on an anhydrous and normalized basis.

167. (New) Electrical process according to claim 163, in which the time of residence of the reactants is preferably more than 0.1 second, more preferably more than 1 second, and still more preferably more than 3 seconds.

168. (New) Use of one or more electrical reactors according to claim 96, for:

(i) the production of synthesis gas used for example for the production of methanol, and preferably for plants having an electrical consumption of 1 to 5 MW:

(ii) valorizing energy and/or chemical products derived from biogas produced in sanitary burying sites;

(iii) producing hydrogen for fuel applications associated with highway transportation, by way of example for supplying automobiles and buses; and

(iv) producing hydrogen for portable or stationary applications, by way of example for feeding fuel cells intended for residences and highway vehicles.

169. (New) Electrical process according to claim 133, used for:

(i) the production of synthesis gas used for example in the production of methanol, and preferably for plants having an electrical consumption of 1 to 5 MW;

(ii) valorizing energy and/or chemical products derived from biogas produced in sanitary burying sites;

(iii) producing hydrogen for fuel applications associated with highway transportation, by way of example for supplying automobiles and buses; and

(iv) producing hydrogen for so-called portable or stationary applications, by way of example for supplying fuel cells intended for residences and highway vehicles.

170. (New) Use of the process according to claim 133, for desulfuring sulfur containing gases.

171. (New) Chemically active conductive lining for catalytic reforming, in the presence of an oxidizing gas, a gas comprising at least one possibly substituted hydrocarbon, and/or at least one possibly substituted organic compound, containing carbon and hydrogen atoms as well as at least one heteroatom; said lining consisting of unitary elements, based on intermetallic compounds and/or their oxides, and said unitary elements being subject to an electrical current.

172. (New) Conductive lining according to claim 171, in which the intermetallic compounds are selected from the group consisting of elements of group VIII of the periodic table (CAS numbering) and alloys thereof containing at least one of said elements, preferably the lining is selected from the group consisting of at least 80 % of one or more of said elements of group VIII, still more particularly from the group consisting of iron, nickel, cobalt and their alloys containing at least 80 % of one or more of these elements, still more advantageously, the lining is selected from the group consisting of carbon steels.

173. (New) Conductive lining according to claim 171, in which the unitary elements consist of a material which, in dense state, has an electrical resistivity at 20 °C that is comprised between 50×10^{-9} and 2000×10^{-9} ohm-m, more preferably comprised between 60×10^{-9} and 500×10^{-9} ohm-m, and still more preferably comprised between 90×10^{-9} and 200×10^{-9} ohm-m.

174. (New) Conductive lining according to claim 171, in which the unitary elements are in a form selected from the group consisting of straws, fibers, filings, frits, balls, nails, threads, filaments, wools, rods, bolts, nuts, washers, chips, powders, grains, granules and perforated plates.

175. (New) Conductive lining according to claim 171, in which the unitary elements at least partly consist of perforated plates and the surface percentage of the perforations in the plate is comprised between 5 and 50 %, and still more preferably between 10 and 20 %.

176. (New) Conductive lining according to claim 174, in which the unitary elements that constitute the lining consist of soft steel wool.

177. (New) Conductive lining according to claim 171, in which the unitary elements of the lining material are previously treated to increase at least one of the following characteristics:

a. specific surface area;

b. purity; and

c. chemical activity.

178. (New) Conductive lining according to claim 177, in which the previous treatment is a treatment with a mineral acid and/or a heat treatment.

179. (New) Conductive lining according to claim 171, consisting of fibers having a characteristic diameter comprised between 25 micrometers and 5 mm, still more preferably between 40 micrometers and 2.5 mm, and still more preferably between 50 micrometers and 1 mm, as well as a length higher than 10 times its characteristic diameter, more preferably higher than 20 times its characteristic diameter and still more preferably higher than 50 times its characteristic diameter.

180. (New) Conductive lining according to claim 171, defining a porous medium having a volume surface of more than 400 m^2 of exposed surface per m^3 of reaction chamber, preferably more than 1000 m^2/m^3, still more preferably more than 2000 m^2/m^3.

181. (New) Conductive lining according to claim 171, consisting of balls and/or threads based on at least one element of group VIII and at least one metal oxide, preferably iron or steel based.

182. (New) Conductive lining according to claim 171, having a porosity index comprised between 0.50 and 0.98, more preferably comprised between 0.55 and 0.95, and still more preferably between 0.60 and 0.90.

183. (New) Conductive lining according to claim 182, consisting of wool made of steel threads mixed with spherical materials such as balls made of steel.

184. (New) Conducting lining according to claim 171, containing, in addition to the conductive lining, non conductive and/or semi-conductive and/or electrically insulating materials, such as ceramics and alumina, the latter being adequately disposed in the reaction chamber so as to adjust the total electrical resistance of the lining.

185. (New) In a reforming process, use of unitary elements based on intermetallic compounds and/or their oxides, simultaneously as catalyst and as heating means in their quality as electrical conductors.

186. (New) Use of conductive unitary elements, based on intermetallic compounds and/or their oxides as catalyst in a reforming reactor according to claim 96.

187. (New) Use according to claim 184, in which the unitary elements are in a simple geometric form.

188. (New) Use according to claim 184, in which the unitary elements are in porous form and suitable for the catalysis of the reforming reaction and for heating reactants used in the reforming reaction.

189. (New) Use according to claim 171, in which the unitary elements constitute a fixed bed crossed by an electronic flux.

190. (New) Use according to claim 171, in which the unitary elements are based on iron.